

Supple Ford Bridge
(Jones County Bowstring Bridge)
Spanning the South Fork of Maquoketa River
Clay Township
Jones County
Iowa

HAER No. IA-32

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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
Rocky Mountain Regional Office
National Park Service
U.S. Department of the Interior
P.O. Box 25287
Denver, Colorado 80225

HISTORIC AMERICAN ENGINEERING RECORD

Supple Ford Bridge
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Location: South fork of the Maquoketa River
SE 1/4 Section 8, T83N R1W
Clay Township, Jones County, Iowa

UTM: Zone 15 Easting 667020 Northing 4672140
Quad: Canton, Iowa (1980)

Date of Construction: 1875

Present Owner: Jones County, Iowa

Present Use: Vehicular

Significance: The Jones County bowstring arch-truss bridge is a virtually intact example of a once-common technology in bridge design in Iowa, the bowstring bridge designed by the King Bridge Company of Cleveland, Ohio. In 1980, this bridge was described as one of only approximately 28 remaining bowstring bridges in Iowa and one of four remaining bowstring bridges in Jones County.¹ It was erected in 1875 and is the second oldest surviving iron truss bridge in Jones County and the oldest remaining bridge built by the King Iron Bridge Company in the county today.

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Date: September 26, 1990

PART I. HISTORICAL INFORMATION

A. Physical History:

1. Date of Erection: 1875. This date is clearly established by an 1879 Jones County history and a corroborating newspaper article from the April 22, 1875, Monticello Express, as well as from 1874-75 Jones County Board of Supervisors' Minutes in the Auditor's Office of the County Courthouse.
2. Architect: Unknown.
3. Original and subsequent ownership: Public ownership.
4. Builders, suppliers:
 - a. Builders: Masonry bridge piers by A. D. Kline, Wybel & Co., Monticello, Iowa, and subcontractor James Milne, Wayne, Iowa.
 - b. Suppliers: King Iron Bridge Company, Cleveland, Ohio.
5. Original plans and construction: the original plans for this bridge have not been found. However, this bridge is mentioned in the 1998 catalogue of the King Iron Bridge Company² and is similar in design to the King Iron Bridge Company's two spans erected at the Centennial Exhibition in Philadelphia in 1876.³
6. Alterations and additions: This is an unusually intact example of its type. Inevitably, the traffic deck has been renewed. The Jones County Bridges book in the County Engineer's office indicates that the bridge was repaired in 1941 and 1947, but the repairs are not specified.⁴ A 1947 flood carried the bridge a few hundred yards downstream and the bridge was hauled back on to its masonry abutments at that time.⁵

B. Historical Context:

This bowstring arch-truss bridge is located in Clay Township in the northeastern portion of Jones County, which, in turn, is located in the northeastern quadrant of Iowa. The bridge crosses the South Fork of the Maquoketa River about a mile and a half east of highway 136 which runs north-south between the small towns of Cascade to the north and Wyoming to the south. The Wisconsin Territorial legislature named Jones County and designated its boundaries at its 1837-38 session before Iowa came into legal existence, at which time there were around 241 inhabitants. The county was formally organized in 1839 and, in 1842, it was organized into townships. Settlement began in earnest during the 1840s and, by 1875, Jones County had a population of 19,166, only 40 less than its 1938 population.⁶ The first permanent settlers of Clay Township arrived there in 1838. This region of Iowa had many streams and tributaries which tended from

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northwest to southeast, transecting the county and draining, eventually, into the Mississippi River. In Jones County, the south and north forks of the Maquoketa River and the Wapsipinicon River and their numerous creeks required bridges across their waters.⁷

Board of Supervisors' minutes from fall 1874 and spring 1875 in the Auditor's Office, County Courthouse, indicate that the county received numerous citizen petitions for bridges at each supervisor's meeting. Bridges were usually requested at mill sites or sites where fords afforded the only passage across the numerous rivers and streams along existing roads. Bridges, like roads, came under "internal improvements" and were funded in part by the sale of swamp lands, land grants received by Iowa at statehood.⁸ The usual practice by 1879 was for the county supervisors to finance bridges by making appropriations from the county treasury and raising the remainder of the money by subscription. the citizens most interested in a bridge would subscribe an annual sum to the county.⁹

The 1879 Jones county history indicates that the first bridges were wooden and, in fact, the first bridge in the county was erected by the government on the old government-owned Military Road between Dubuque and Iowa City across the wapsipinicon River at Anamosa. In 1857, two bridges were erected across the South Fork of the Maquoketa and the Wapsipinicon rivers, both major waterways through the county. The 1879 county history notes that "wooden bridges only were erected for a time, but a longer-sighted policy has of late years led to the building of substantial iron superstructures."¹⁰

The Supple Ford Bridge was one of the earliest iron bridges erected in Jones County and one of the only remaining pre-1880 iron bridges today. Iron bridges seem to have come into common use in Jones County during the decade of the 1870s. The earliest specific mention of a Jones County iron bridge in the county history is the bridge built across the South Fork of the Maquoketa River near Walter's Mills in June 1871. Now gone, this bridge was located in Clay Township in Section 10, about a mile and a half east of the Supple Ford Bridge at what later became known as Clay Mills.¹¹ James Hippen, author of an undocumented report on the Supple Ford Bridge and faculty member in history at Luther College in Decorah, Iowa, identifies the extant iron bridge in Wayne Township, south of Monticello (Sec. 3 T85N R3W) as the 1870 Corbet's Mill (or Eby's Mill) Bridge. He notes that it is now on private property and in danger of collapse because of "crumbling abutment."¹² This was one of two bridges (Clay Mills was the other) put up for around \$3,000 each and presumably both of iron. Another early iron bridge was located at Newport in 187. Built by the King Bridge Company, it replaced an earlier wooden one built in 1865. This bridge is now gone, but was located in Jackson Township in Section 33.¹³

The 128-foot-long bowstring bridge, built by the Massillon Bridge Company of Ohio in 1873, is still extant and was moved to the Jones County Central Conservation Park in 1985, about six miles east of Anamosa in Section 1 of Jackson Township. According to Bill Corbin, a local bridge researcher, it was built over the Maquoketa River on the military road at Monticello in May 1873 and was the fifth iron bridge erected in Jones County. There, it remained until the

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old military road became part of the state highway system and a sharp curve was corrected, requiring the building of a new bridge upstream from the old. It was abandoned in June 1930 and "Elmer Coon of Monticello was awarded the contract by the county to move the bridge to Section 30, Cass twp., across Buffalo Creek."¹⁴ Because the Massillon Bridge might well have been the only one of its kind in Iowa, it was saved and moved to its present location in the park some five years ago.

Another early iron bridge still extant in Jones County is the one across the Wapsipinicon River at Anamosa which was completed in 1873 by the Ohio Bridge Company. According to the Jones County Engineer's Office staff, this bridge is situated by the dam and is still there (which could be T84N R4W). It is worth noting that this bridge is not the one mentioned in the 1989 Hippen report and may not have been on a 1980 Iowa Department of Transportation list, from which Hippen counted only around 28 remaining bowstring bridges in the state.¹⁵

Hippen mentions another extant bridge built by the King Iron Bridge Company, located in Hale Township in Section 15 T83N R2W over the Wapsipinicon River.¹⁶ The date of this bridge is unclear, but it may be the bridge mentioned in the 1879 county history as having been erected for \$8,000 in Hale Township in 1870 near Ballou's stone quarry.¹⁷

The 1879 Jones County history has the following description of the Supple Ford Bridge: "The bridge at Supple's Mills was completed in 1875, at an expense of 46,654.46. The contractors were Kline, Wybel & Co., and Z. King & Co."¹⁸ It was necessary to determine if this was the subject bridge in Section 8 of Clay Township, since the subject bridge did not have a date on the plaque. Tract indices in the Auditor's Office of the county courthouse and indices in the Recorder's Office showed that the Supple family had owned the land in Section 8 since at least 1874.¹⁹ The A. T. Andreas Illustrated Historical Atlas of the State of Iowa indicated that there was no mill on this site in 1875 and the local historian recalled no mill in Section 8.²⁰ It did, however, show a road and a ford at the current site of the bridge in 1875. In addition, Jacob Swisber's Iowa: Land of Many Mills had recorded no Supple Mill in Clay Township during the 1870s.²¹

The Board of Supervisors was in charge in bridge building in the county and received frequent petitions at its regular meetings. The supervisors' minutes, from October 1874 through April 1875, show that this body met for two days on three occasions, in October, January and April. Along with the election of officers and committees, the supervisors spent hours considering petitions to the bridge committee for new bridges, along with the usual matters involving the running of the county poor farm, and the county budget.

The first mention of the Supple Ford Bridge in the Board of Supervisors' minutes is found on October 20, 1874, when a bridge petition by Peter Smith et. al. and John Supple at Supple's Ford was considered. A motion to approve a bridge at this spot prevailed.²² The January 1875 meeting of the supervisors was taken up with many bridge petitions. No additional mention was made of the Supple Ford Bridge matter. At the April 5, 1875, meeting, the following is

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recorded: "The communication of G. H. Wheelock in reference to the length of the bridge at Supple Ford was then read and action had." Later in the day, the supervisors took up the petition of Kline, Wybell & Co. claiming payment for \$68.75. They were the masonry contractors for the bridge. The supervisors allowed payment of \$60.81 of the bill.²³

The next mention of the Supple Ford Bridge is found in the April 22, 1875, edition of The Monticello Express in an article entitled "Another Gouge: \$2,815.50 Paid for Piling for the Supple Ford Bridge." According to this article, the Board of Supervisors received for the new bridge pilings [the stone]: Kline bid 50 cents per linear foot and James Milne bid 37-1/2 cents per linear foot. Each also bid on the masonry work with Kline's bid lower. Both contracts were awarded to Kline. Milne withdrew his bid for the piling material. Kline then turned around and subcontracted the piling material to Milne and charged his original 50 cents per linear foot, 12-1/2 cents more per linear foot than Milne had bid to begin with. The Express charged that the bridge would cost almost \$7,000, some \$2,000 more than it should have, and that the Board of Supervisors, particularly the Democrats in the majority, had arranged this "fix."²⁴ Incidental to this story is that Kline appears to be Andrew D. Kline, son of Abram D. Kline, Sr., who came to Dubuque County, Iowa, in 1832 and to Jones County in 1866. His son, Andrew, who did the masonry work on the Supple Ford Bridge, had, by 1879, moved on to Kansas.²⁵

The Board of Supervisor's minutes give no clue as to how they decided which bridges to build in the county and which petitions for bridges to turn down. The South Fork of the Maquoketa River was one of three major watercourses in the county and these rivers would have received the most attention in internal improvements. The Andreas' Illustrated Historical Atlas of the State of Iowa in 1875 shows the road and the ford across the river where the bridge is today. This dirt road was a way to get from the east side to the west side of the South Fork. The Supple Ford Bridge appears to have had no discernible impact on the development of the surrounding area. There was no town at the ford itself, either before or after completion of the bridge. The road and subsequent bridge may have been a circuitous way for locals to get from Clayford, approximately a mile to the west and on the west side of the South Fork of the Maquoketa River, to Clay Mills or Walter's Mills about two miles east and downriver of Supple Ford and on the east side of the river. Clayford was never more than a post office which was established in 1861 and discontinued in 1902. Clay Mills was a busy center during the decades after its founding in 1852 with a dam, grist mill and sawmill. Its plat was filed in 1867 and had a post office until discontinued in 1902. In 1875, it was known as Walter's Mills. Clayford and Clay Mills were geographically only three miles apart. By the Supple Ford route, the distance was a little more than three and a half miles.²⁶

The Supple Ford Bridge was, as Hippen notes:

A produce of the King Iron Bridge Company of Cleveland, Ohio. . . . This company was a major builder of wagon bridges in Iowa, as well as throughout the midwest and elsewhere in the United States. The type of structure was known by the company as a "Wrought Iron Tubular Arch Bridge." Generally these bridges were

called "bowstring" or "arch truss" in the nineteenth century, although, as one civil engineer of that era remarked, "the bowstring is properly not a truss at all, but simply an arch wherein the horizontal tie takes the place of fixed abutments." The web members, the verticals and diagonals, would, however, under a moving load tend to act like the web members of a true truss, transmitting tensile or compressive forces.²⁷

Most bridge historians are familiar with the King Iron Bridge Company, started by Zenas King of Cleveland, because it became one of the leading bridge companies in the second half of the nineteenth century of national scope. King's genius was in developing a company which combined an aggressive formally-trained sales force with standardization of design and manufacturing, and a tubular bowstring bridge which combined strength and thin metal members. King's Company was particularly successful because of the size and geographical spread of its sales force which used published catalogues printed in 1875 and 1884 and annual corporate reports which depicted the firm's bridges in minute detail.²⁸

PART II. ARCHITECTURAL INFORMATION

A. General Statement:

1. **Architectural Character:** The Supple Ford Bridge was built in 1875. It is a single span, bowstring arch-truss through bridge that carries one lane of traffic.
2. **Condition of fabric:** The bridge has been in service since its construction. Allowing for the replacement of the traffic deck periodically, the historic fabric of this bridge appears to be very much intact. Historical integrity notwithstanding, a five-ton weight limit was placed on the bridge when the structural integrity of its members became questionable sometime in the past 20 years.

B. Description:

The overall length of the bridge is 100 feet 4 inches and its width is 15 feet 4 inches. resting on locally-quarried limestone abutments, the traffic deck is carried by seven floor beams, each of which is a 9.25 feet by 4 feet "I" beam. Perpendicular to the floor beams are eleven 12 foot by 3 inch timber deck stringers. The bottom lateral bracing is comprised of cylindrical rods, the ends of which are threaded. The deck is timber.

The floor beams are hung from seven verticals, each of which has an "A" shape and is fabricated from two 2.25-foot cross (+) shaped angles, as well as lattice work of 1 foot by .25 inch flat iron. Each vertical tapers to form a threaded, cylindrical rod which passes through the bowstring top chord. The four outermost verticals are anchored by large nuts immediately after passing through the bow-string chord. The center verticals extend beyond the chord and accommodate

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a 3-inch by 2.30-inch "I" beam strut. The verticals to the immediate right and left of center also extend above the chord and serve to anchor 23.5-inch high lattice work sway braces. The lattice framework consists of paired 1.5-inch angles, while the lattice work itself uses 1-inch by .25-inch flat iron. Threaded .87-inch cylindrical rods are used for the top lateral bracing. The bowstring chord is 7.69 inches by 9 inches, and is fabricated from channels and stay plates, while the diagonals are threaded .87-inch cylindrical rods. The lower chord has an overall dimension of 4-inch by 4.5-inch, and is comprised of two 4-inch by .75-inch vertically-placed pieces of flat iron.

All major connections on this bridge appear to be secured with nuts and bolts.

The Supple Ford Bridge is a functional structure. In keeping with the original, as well as the contemporary rural setting, it has no decorative features. Original name plates, reading "King Iron Bridge Co. Cleveland, O.," were mounted on the so-called portals at each end, but were removed by the county engineer's office within the last 18 months and have been temporarily misplaced.

C. Setting:

This bridge is located approximately 9.5 miles south of Cascade, Iowa, on the South Fork of the Maquoketa River. Oriented on a northeast/southwest axis, the bridge is surrounded entirely by gently rolling farm and grazing land. A small wooded area along the riverbank is immediately downstream from the bridge. A large sandy floodplain is immediately upstream.

III. PROJECT INFORMATION

This project has been sponsored by the Iowa Department of Transportation and Jones County, Iowa, as a matching 80%-20% project. The project is identified as Iowa DOT SBRFM-FM53 (1)--5D-53. Initially, this was to be a federally-funded project. This project is filed under BROS-9053(15), Federal Bridge no. 207830, in the Iowa State Historic Preservation Office in Des Moines, Iowa. Documentation was prepared by Dr. Norene Roberts (research and report) and Dr. John N. Vogel (physical description and photography) in August and September 1990.

IV. ENDNOTES

1. Hippen, p. 6.
2. Hippen, p. 1.
3. Simmons, p. 28, Figure 6.
4. "Bridge H-1642" in Jones County Bridges. On file: County Engineer's Office, Jones County Courthouse, Anamosa, Iowa.
5. Hippen, p. 6. The story of the 1947 flood which carried the bridge off its abutments was verified by another passerby, a local resident, on September 5, 1990, as the study team was completing the HAER photographic recording.
6. The Anamosa Eureka, Centennial Edition, Section 1, p. 1 (1938).
7. Ibid., Section 1, p. 7.
8. Board of Supervisors' Minutes, October 1874-April 1875, in Book C, Auditor's Office, Jones County Courthouse, Anamosa, Iowa.
9. Jones County, Iowa, Historical Society, p. 349.
10. Ibid.
11. Ibid.; Andreas, p. 57; Atlas and Plat Book of Jones County, 1920, p. 19.
12. Hippen, p. 6 and p. 8.
13. Corbit, p. 349.
14. Letter from Bill Corbin to Mrs. Frankfurt, July 1, 1985. On file: County Engineer's Office, Jones County Courthouse, Anamosa, Iowa. Mr. Corbin, whose father engaged in bridge building, has compiled information on local bridges. He offered to sell the information to the HAER study team, but was not forthcoming when contact was made. The letter cited here suggests that he may have additional information on the Supple Ford Bridge. he resides in Monticello, Iowa.
15. See Hippen, p. 6.
16. Ibid.
17. Jones County, Iowa, Historical Society, p. 349.

18. Ibid.
19. Tract Indices, 1880-1886, Auditor's Office; Transfer Book Lands, #84. #86, Recorder's Office, Jones County Courthouse, Anamosa, Iowa.
20. Andreas, p. 57; Interview with C. L. Norlin, September 4, 1990.
21. Swisher, p. 260.
22. October 20, 1874, Board of Supervisors' Minutes, Book C, Auditor's Office, Jones County Courthouse, Anamosa, Iowa.
23. April 6, 1875.
24. The Monticello Express, April 22, 1875, "Another Gouge: \$2,815.50 Paid for Piling for the Suple Ford Bridge."
25. Jones County, Iowa, Historical Society, "Abram D. Kline" entry, p. 672.
26. Andreas: on Clayford, see Corbit, p. 278; on Clay Mills, see p. 275.
27. Hippen, pp. 1 , 3.
28. Simmons, pp. 23, 26, 32.

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